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EDITORIAL.

THE importance has long been recognised of bringing the practical results obtained from the work of research officers in this Department to the knowledge of the planting community in general and more especially of the small holder, and at the same time the methods and requirements of the cultivator to the knowledge of the research officer. To achieve this must be bridged a gap which in its extreme width extends on the one hand from a European officer trained in the latest developments of Science to, on the other, a simple and often illiterate Asiatic peasant.

The easier problem of conveying these results to the European planting community can be met by publications in English, by correspondence, and when necessary by lectures and demonstrations. While these same methods are applicable to Asiatic small holders, they are not in themselves sufficient, more especially because ancient prejudices have often to be overcome and because the small holder requires to be educated to some extent to enable him to understand the information conveyed to him. For these two reasons personal teaching and demonstration both for adults and for children become of great importance and necessitate the services of officers well known to and trusted by the peasants among whom they work.

For the work described, a staff of two Agricultural Instructors was provided in 1914. Plans were made for increasing this staff and its activities, but these could not be put into operation owing to the financial stringency during recent years.

There is, however, also in existence a considerable staff of Inspecting officers, both Europeans and Malays, whose main duties in the past have been to ensure the adequate treatment of pests and diseases of cultivated plants. In order to overcome the difficulty caused by lack of money and to proceed with the much needed extension of Agricultural Instruction, an arrangement was approved and put into operation in July last whereby the Inspecting officers undertake a portion of the duties of Instructors.

The Instruction staff retains in its charge the organization of School Gardens and the dissemination or agricultural information obtained by research in the laboratories or in the Experiment Stations

through the medium of an Agricultural periodical published in the Malay Language under the title of "Warta Perusaha'an Tanah." It also advises and co-operates with the Inspection Staff. But much of the field work in personal contact with the peasants is now the duty of the Inspection Staff. The activities of these officers commence in the Experiment Stations, such as that recently established in Malacca for padi breeding, and in the testing plots for padi such as those recently planted in the Province and near Kuala Kangsar. On these plots pure strains of padi selected by the Botanist from the padi Experiment Station at Titi Serong are tested for their suitability under varying local conditions. The Inspectors are also responsible for establishing demonstration plots to introduce to the small holders not only approved strains of padi but also any new crops that have been proved suitable for cultivation, such as roselle and kapok. Another function is to distribute seed of improved strains of plants, such as padi, and to see that such seed is properly planted and kept reasonably pure in later generations. The Inspectors give demonstrations and advice concerning the control of pests and advice on new points connected with the cultivation of established crops, particularly rubber and coconuts. Finally they give assistance in organising Agricultural Shows, although the Instructors also take a considerable share of this work.

While the Inspectors may in the course of their duties obtain information useful in connexion with schemes for co-operation, they are not expected to take a more active part in such work, as they have not the time for it.

Posters or pamphlets regarding new crops or pests of crops are prepared in Asiatic languages by either the Instruction or the Inspection division as required. These as well as the Malay Bulletin are distributed by reference to a list, kept up to date by the Department, of all Malay Chiefs, penghulus and other Malays of standing, as well as all officers of the Education and Co-operative Departments. By this method the Department keeps in close touch with those most likely to benefit by the publications.

The success of the scheme depends on close co-operation between all the branches of the Department; on the provision to the Field Officers of full information on all new points arising from Research; and lastly to no small extent on the energy and initiative of the Malay Officers who form a large proportion of the Inspection Staff and on their ability to obtain the confidence and interest of those among whom they work. It is hoped that, as the scheme matures and the small cultivators learn to realise the value of the help and advice at their disposal, a solid bridge will have been built across the wide gap separating the research officer from the Asiatic cultivator.

SOME MALAYAN VEGETABLE OILS AND FATS OF MINOR IMPORTANCE.

By C. D. V. Georgi.

THE Departmental exhibit of vegetable oils and fats at the recent Malaya-Borneo Exhibition included a number of the lesser known oils and fats, which had been prepared from seeds and fruits cultivated locally.

A list of some of these is given in the following table :—

Name of Oil or Fat.	Malay Name.	Botanical name of Plant.	Source.
Brazil nut Oil	...	*Bertholletia excelsa* ...	Government Plantations, Kuala Lumpur.
Calophyllum Oil	Minyak ... Penaga	*Calophyllum Inophyllum*	Public Gardens, Penang,
Croton Oil ...	Minyak ... Chengkian	*Croton Tiglium* ...	Government Plantations Kuala Lumpur.
Pulasan Fat ...	Minyak ... Pulasan	*Nephelium mutabile*	Datok Mat Sah, Penghulu Pasangan District, Kuala Selangor.
Rambutan Fat	Minyak ... Rambutan	*Nephelium lappaceum*	„ „

Croton Oil is the only one which can be considered at present as economically important, and this oil is used only to a limited extent in pharmacy. In the case of the others the extraction of the oil can only be regarded as of minor importance and of scientific interest.

Brazil nuts, Pulasans and Rambutans are known primarily as fruits and hence the expression or extraction of the oil is very seldom carried out, while in the case of Calophyllum the tree from which the seed is obtained is only sparsely distributed in this country and the quantity of oil available very small.

As however all these trees can be grown in this country it was considered advisable to examine the samples of oils and fats and ascertain whether their analytical constants were comparable with those of the same oil or fat from other sources.

Brazil Nut Oil.

Brazil nut oil is obtained from the seeds of the Brazil nut tree *Bertholletia excelsa*, (Natural Order *MYRTACEAE*) indigenous to South America, but which can be cultivated successfully in this country.

The nuts are in great demand as a dessert nut and therefore the oil is very little known. In South America a certain amount of the oil is pressed out by the natives and used for edible purposes, but in countries to which these nuts are exported only those which are spoilt

and unfit for sale as dessert are utilised for oil expression, the oil being used for soap making purposes.

An investigation of the nuts from the Government Plantations at Kuala Lumpur gave the following results:—

The nuts were of characteristic appearance being about 1½ inches long and 1 inch wide at the base, with a shell only about $^1/_{20}$ of an inch thick.

Average weight of nut	6 grams.
Percentage of husk	51.4
Percentage of kernel	48.6

Kernel.	Per cent.
Moisture	6.5
Oil (Chloroform extract) ...	60.3
Residue (by difference) ...	33.2
Oil (calculated on dry kernel) ...	64.5
Oil (calculated on whole nut) ...	29.3

A sample of warm pressed oil was found to have the following analytical constants, which will be seen to compare favourably with those given by Lewkowitsch in "Chemical Technology and Analysis of Oils, Fats and Waxes," Vol. II, page 189.

Oil.	Present sample.	Lewkowitsch.
Density (15.5°C) ...	.9166	.9180
Refractive Index (20°C)	1.4711	...
Saponification Value ...	192.0	193.0
Iodine Value (Wijs method)	101.7	106.2
Acidity (Oleic Acid per cent.)	0.6	...
Fatty Acids.		
Solidifying point (Titer Value)	31.4°C	31.1-32.2°C
Mean Molecular weight	297.5	...

The cold pressed oil was practically colourless and odourless, and its flavour was similar to that of the nut. The oil was easily expressed, especially when the nuts were slightly warmed, but the oil then developed a yellowish colour.

There is no doubt that this oil is highly suitable for edible purposes, while the comparatively high solidifying point of its fatty acids indicates its utility for the manufacture of soaps. It is however most unlikely that it will ever be brought into general use for either of these purposes, since the supply of nuts is relatively so small.

Calophyllum Oil.

Calophyllum Oil is obtained from the seeds of *Calophyllum Inophyllum*, (Natural Order *GUTTIFERAE*) a large tree indigenous to the coastal districts of tropical Asia and East Africa.

The seeds when received from Penang were still green, but gradually turned brown, the surface becoming shrivelled. The seeds were round, about 1½ inches in diameter, and consisted of a thick outer shell, containing a small kernel about ¾ inch in diameter.

The shell was woody on the outside, spongy in the middle while on the inside there was a thin, brown, highly polished lining or skin.

The kernels which were loose in the shells were yellowish when freshly opened but turned brown on exposure to air. This discolouration was confined to the surface.

The average weight of the fresh green seed was found to be 13 grams (nearly ½ oz.) the kernel weighing 2.95 grams. The proportion of husk to kernel was found to be as follows:—

Husk	...	77.3 per cent.
Kernel	...	22.7 „ „

The kernels lost a considerable amount of moisture on keeping, the average weight of some kept for 3 months decreasing to 2.32 grams, representing a loss of about 20 per cent.

The results of analysis of these partially dried kernels were as follows:—

	Per cent.
Moisture	... 21.6
Oil and Resin (Chloroform extract)	... 48.1
Residue (by difference) ...	... 30.3
Oil and Resin (calculated on dry kernel)	... 61.4
Oil and Resin (calculated on fresh kernel)	... 37.1
Nitrogen in dry oil-free residue ...	... 3.58

A quantity of the kernels was warm pressed in a laboratory hand press in order to obtain a sample of the oil for the determination of the analytical constants.

The expressed oil was thick, dark greenish brown in colour; on standing a small amount of a greenish sediment separated out. This consisted principally of resin which was present in the oil to the extent of about 10 per cent.

The resin was extracted by shaking the crude oil with a 10 per cent. solution of sodium carbonate, the resultant oil being much less viscous and yellowish brown in colour.

The following analytical constants were obtained for the oil (*a*) containing resin (*b*) free from resin. These results will be seen to compare favourably with those given in Lewkowitsch, "Chemical Technology and Analysis of Oils, Fats and Waxes" Vol. II, Page 301.

	Containing resin		Free from resin	
	Present sample.	Lewkowitsch.	Present sample.	Lewkowitsch.
Oil.				
Density (15.5°C) ...	.9411	.9428	.9276	...
Refractive Index (20°C) ...	1.4814	...	1.4753	...
Saponification value ...	184.2	196.0	188.4	191.0
Iodine value (Wijs method)	98.1	92.8	90.0	86.0
Acidity (Oleic acid per cent.)	17.5	...	0.9	...
Unsaponifiable matter (per cent.)	0.7	...	...	...
Fatty Acids.				
Solidifying point (Titer value)	32.1°C	33.0°C	33.3°C	...
Mean Molecular weight	298.4	289.2	291.5	...

On account of the presence of the resin which is poisonous, the oil cannot be used for edible purposes but is said to be employed locally by natives as an illuminant and also for medicinal purposes, particularly for skin affections and rheumatism.

It will be noticed that the extracted meal (after removal of the oil) contains a fair proportion of nitrogen which might render it suitable for fertilising purposes.

Croton Oil.

Croton oil is obtained from the seeds of *Croton Tiglium*, (Natural Order *EUPHORBIACEAE*) a tree indigenous to Southern India and Ceylon, but which is now found cultivated throughout Southern Asia.

The seeds are contained in small capsules somewhat similar to those of the castor oil plant. The shelled seeds are brownish in colour and rather larger than the small variety of castor oil seed. The seeds contain about 55 per cent. of oil, which has an orange yellow colour, nauseating odour and a burning taste.

The sample of oil obtained by expression was found to have the following analytical constants which are in fair agreement with those given by Lewkowitsch, "Chemical Technology and Analysis of Oils Fats and Waxes," Vol. II, page 183.

	Present sample.	Lewkowitsch.
Oil.		
Density (15.5°C) ...	.9501	.9375—.9428
Refractive Index (20°C)	... 1.4810	...
Saponification Value	... 212.1	215.0
Iodine Value (Wijs Method)	... 115.9	101.7—102
Acidity (Oleic Acid per cent.)	... 0.9	...
Fatty Acids.		
Solidifying Point (Titer Value)	... 15.35°C	18.6—19.0°C
Mean Molecular weight	... 274.4	...

The Iodine and Titer values for the sample differ somewhat from those quoted by Lewkowitsch, but these differences are only of the

usual order which is sometimes found when comparing samples of similar oil from various sources.

On account of its strong cathartic action Croton oil finds a limited application in pharmacy; while it is also employed in the preparation of certain liniments. It could also be used for soap making.

Pulasan Fat.

Pulasan Fat is obtained from the seed of the Pulasan, well known as a fruit in this country. The Pulasan tree is known botanically as *Nephelium mutabile* (Natural Order *SAPINDACEAE*).

When dried the seeds are flattish, pointed at one end, about 1 inch long, half an inch broad and $\frac{3}{4}$—$\frac{1}{3}$ of an inch thick.

An investigation of the seed gave the following results:—

Average weight of seed	2 grams.
	per cent.
Moisture	6.4
Fat (Chloroform extract)	59.9
Residue (by difference)	33.7
Fat (calculated on dry seed)	64.0
Nitrogen in dry fat-free residue	4.48

The material available was too small to obtain by pressure sufficient fat for the determination of the analytical constants. The residue after pressing was therefore extracted with ether and the fat thus extracted added to that obtained by expression.

Pulasan fat at the ordinary atmospheric temperature (28—30°C) is a hard white fat, melting at about 40—42°C to a yellow oil. The fat has a faintly sweet smell.

The analytical constants were as follows:—

Fat.

Density 99°C (water at 15.5°C = 1) ...	.8597
Refractive Index (40°C)	1.4579
Saponification value	199.0
Iodine value (Wis method)	41.6
Acidity (Oleic acid per cent.)	3.5

Fatty Acids.

Solidifying point (Titer value)	50.9°C
Iodine value (Wijs method)	40.9

As far as can be ascertained there are no published results for this fat, but it will be seen that these constants are in close agreement with those for Rambutan fat.

This fat would be suitable for edible purposes, while the high solidifying point of the fatty acids would also render it useful in the preparation of soaps and candles. The quantity of seed available however is too small for economic purposes in these respects.

Rambutan Fat.

Rambutan fat is obtained from the seed of the Rambutan, known botanically as *Nephelium lappaceum* (Natural Order *SAPINDACEAE*). This fruit like the Pulasan is well known throughout the country.

As might be expected the seeds are similar to those of the Pulasan, except that in the present sample it was noticed that they were slightly longer and more pointed than the Pulasan.

The results of an analysis were as follows :—

Average weight of seed	1.8 grams.
	per cent.
Moisture	7.5
Fat (Chloroform extract)	34.2
Residue (by difference)	58.3
Fat (calculated on dry seed)	37.0
Nitrogen in dry fat-free residue	2.55

The sample of fat for the determination of the analytical constants was prepared in a similar way to the sample of Pulasan fat to which this one is closely allied.

The fat is a hard white product at ordinary temperatures resembling Pulasan fat; it melts at about the same temperature (40—42°C) to a yellow oil and has a similar sweet smell.

The table below gives the analytical constants obtained for the present sample together with the figures given by Lewkowitsch "Chemical Technology and Analysis of Oils, Fats and Waxes," Vol. II, page 473.

Fat.	Present sample.	Lewkowitsch.
Density 99°C (Water 15.5°C = 1) ...	.8629	.9236*
Refractive Index (40°C) ...	1.4590	...
Saponification Value	193.4	193.8
Iodine Value (Wijs method) ...	43.8	39.4
Acidity (Oleic acid per cent.) ...	2.4	...
Fatty Acids.		
Solidifying point (Titer value) ...	51.5°C	...
Iodine value (Wijs method) ...	42.3	41.0

These results will be seen to be in close agreement with those given by Lewkowitsch.

Like Pulasan this fat would be suitable for edible purposes as well as in the manufacture of soaps and candles but is not likely to be available in sufficient quantity to be of economic importance.

* Temperature not stated.

REGULATIONS CONTROLLING THE IMPORTATION OF PLANTS INTO THE STRAITS SETTLEMENTS, THE FEDERATED MALAY STATES AND JOHORE

By F. W. South.

INTRODUCTION.

THE regulations controlling the importation of certain plants into the Straits Settlements, the Federated Malay States and Johore are scattered in various Notifications that have appeared from time to time in issues of the different Government Gazettes. These regulations are, therefore, not very readily accessible to some of those who may have need of them and the fact that certain of the notifications have been amended by subsequent notifications renders the regulations more difficult to follow. The object of the present short article is to set forth clearly in one place the rules in force on October 31st 1922.

Throughout this article the word "plant" has the meaning assigned to it in the Ordinance and Enactments quoted below; the definition in section 2 of Ordinance 166 (Agricultural Pests) states:—

"Plant" means any tree, shrub or vegetation, whether living or dead and includes the stem, root, leaf, flower or fruit and any product or part thereof whatsoever, whether severed or attached."

The definition is quite comprehensive and clearly includes in particular seeds or fruits for planting, and such parts as stem or root cuttings, suckers, tubers or bud-wood for purposes of propagation.

At the present time the importation of plants into the Colony, the Federated Malay States and Johore through any port is subject to no control, except in the case of the few species of plants which are given in the lists below.

The Straits Settlements.

The plants of which the entry into the Colony is subject to control are, coconut and other palms, Para rubber (all species of Hevea), and sugar-cane.

Coconuts.

Three rules are still in force that were made by the Governor under "The Destructive Pests Ordinance 1908." This Ordinance was repealed by Section 27 of Ordinance 166 (Agricultural Pests), but by virtue of Section 5 (b) of Ordinance No. 131 (Interpretation) the rules themselves remain in force.

The first is Notification No. 1183 in The Straits Settlements Gazette of the 6th November, 1908. It prohibits the importation of all coconuts and other palms from Ceylon.

The second is Notification No. 509 in the Straits Settlements Gazette of the 22nd April, 1910. This prohibits the landing in the Colony of any palms, alive or dead, or any stems or roots or parts of stems or roots of palms, from Sarawak, and authorises the destruction of any such article, if landed in the Colony from Sarawak.

It does not apply to the nuts of the coconut or betel-nut palm or to the husks of coconuts or to oil expressed from coconuts.

The third is Notification No. 623 in the Straits Settlements Gazette of the 31st May, 1912. This prohibits the landing in the Colony of any palms, alive or dead, or any stems or roots or parts of stems or roots of palms or of any products of palms other than such as are expressly exempted from the operation of the Order, from the Philippine Islands. The exempted products are dried copra and the oil expressed from coconuts.

Recent Rules.

Section 22 (i) of Ordinance 166 (Agricultural Pests) states :—

"The Governor may make rules for preventing the introduction of pests into the Colony or any part thereof and for preventing the spread of pests therein. Such rules may provide, amongst other things, for

(*a*) prohibiting the landing in the Colony from places outside the Colony of any plant or animal the landing of which may appear to the Governor to be likely to introduce any pest;

(*b*) the treatment or destruction of any plant or animal which has been landed and of the packages, cases, pots or coverings in which the same may be packed.

Any such rule may be absolute or subject to such conditions and exceptions as may be expressed therein and may apply to the introduction of plants or animals either generally or from any specified place."

Section 2 of the Ordinance states ;—

"'Pests" includes every insect, invertebrate animal, rodent, plant and fungus which is destructive or injurious, or apt to be destructive or injurious, to cultivated plants."

Rubber.

Notification No. 1011 in the Straits Settlements Gazette of the 11th June. 1920 contains The Agricultural Pests Rules, 1919, Amendment Rules, 1920 made by the Governor in accordance with the powers conferred on him by Section 22 of Ordinance 166 (Agricultural Pests) as quoted above.

Rule 2, as further amended by Notification No. 1531 in the Gazette of the 30th September, 1921 and by the sense of Section 2 of Ordinance No. 166 (Agricultural Pests) Amendment Ordinance, 1922,

prohibits the landing in the Colony from any place outside the Colony of any plant of Para rubber, this expression including all species of Hevea, except with the written permission of the Secretary for Agriculture, S.S. and F.M.S. and subject to the terms and conditions, if any, imposed by him when granting the permission.

Sugar-Cane.

The importation of sugar cane is controlled by The Agricultural Pests (Sugar-cane) Rules, 1920 made by the Governor in accordance with the powers already quoted. The rules are contained in Notification No. 1495 in the Gazette of the 27th August, 1920. Paragraph 2 when amended by the sense of Ordinance 166 (Agricultural Pests) Amendment Ordinance, 1922, is as follows:—

"No person shall land or cause to be landed in the Colony from any place outside the Colony any plant of sugar-cane, *Saccharum officinarum*, *L.* except under the following conditions:—

"(1) All shipments shall be confined to material for planting purposes only and shall be accompanied by a certificate signed by an officer of the Government Department of Agriculture of the exporting country, or by any competent person therein previously approved by the Secretary for Agriculture, S.S. and F.M.S, to the effect that it was taken from healthy plants and was at the time of packing, so far as could be ascertained, free from pests.

"(2) The Secretary for Agriculture, S.S. and F.M.S. shall be notified of the arrival of all shipments of cane plants, and they shall be inspected on landing before delivery by an Inspecting Officer who shall have power to destroy any diseased plant found, together with the packages, cases, pots or coverings in which the diseased plants may have been packed or to order their disinfection as he may think fit.

"(3) All imported cane plants shall be quarantined in nurseries from which no such plants shall be removed without the written permission of an Inspecting Officer."

The definition of an Inspecting Officer is given in Section 2 of Ordinance 166 (Agricultural Pests).

The Federated Malay States.

In the Federated Malay States the plants of which the importation is controlled include only Para rubber (all species of Hevea) and Sugar Cane.

Section 21 (i) of the Agricultural Pests Enactment, No. 13 of 1913 confers on the Chief Secretary the same powers to make rules as are conferred on the Governor in the Colony by Section 22 of Ordinance 166 (Agricultural Pests); the wording of the two sections is practically identical if "the Federated Malay States" is substituted for "the Colony."

The terms "pest" and "plant" as defined in Section 2, sub-sections (vi) and (vii) of the Agricutural Pests Enactment, 1913 have the same meaning as in the Colonial Ordinance already quoted.

Rubber.

Notification No. 3931 in the Federated Malay States Gazette of the 26th August, 1921, as amended by the sense of Section 4 of The Agricultural Pests Enactment, 1913, Amendment Enactment, 1922, contains a rule made by the Chief Secretary prohibiting the landing in the Federated Malay States from any place outside the said States of any plant of Para Rubber (all species of Hevea) except with the written permission of the Secretary for Agriculture, S.S. and F.M.S. and subject to the terms and conditions (if any) imposed by him when granting such permission.

Sugar-Cane.

Notification No. 2943 in the Gazette of the 16th July, 1920 contains the rules regulating the importation of sugar-cane. When amended by the sense of the Agricultural Pests Enactment, 1913, Amendment Enactment, 1922, it imposes exactly the same conditions as are imposed by the Colonial Agricultural Pests (Sugar-Cane) Rules 1920 quoted above and the wording is practically identical.

Johore.

The plants of which the importation into the State of Johore is controlled are Para rubber (all species of Hevea) and sugar-cane. Section 20 of the Agricultural Pests Enactment, No. 20 of 1921 confers on his Highness the Sultan in Council the same powers to make rules as are conferred on the Governor and the Chief Secretary respectively by the Ordinance and the Enactment referred to above. Section 2 sub-sections (vi) and (vii) give definitions of "Pest" and "Plant" identical with those already quoted.

Rubber.

In Notification No. 18 in the Johore Gazette of the 15th January 1922 His highness the Sultan in Council makes the following rule in exercise of the powers conferred on him by Section 20 of the Agricultural Pests Enactment, 1920.

"No person shall, except with the written permission of the Inspector of Agriculture Johore, in that behalf, and subject to the terms and conditions (if any) thereby imposed, land or cause to be landed in the State from any place outside the said State any plant of Para rubber (all species of Hevea)."

Sugar-Cane.

The same Gazette Notification also contains the rules relating to the importation of sugar-cane, as follows:—

"No person shall land or cause to be landed in the State from any place outside the State any plant of sugar-cane, (*Saccharum officinarum*, L,' except under the following conditions:—

"(1) All shipments shall be confined to material for planting purposes only and shall be accompanied by a certificate signed by an

officer of the Government Department of Agriculture of the exporting country, or by any competent person therein previously approved by the Inspector, to the effect that it was taken from healthy plants and was at the time of packing, so far as could be ascertained, free from pests.

"(2) The Inspector shall be notified of the arrival of all shipments of cane plants and they shall be inspected on landing before delivery by an Inspecting Officer who shall have the power to destroy any diseased plants found, together with the packages, cases, pots or coverings in which the diseased plants may have been packed or to order their disinfection as he may think fit.

"(3) All imported cane plants shall be quarantined in nurseries from which no such plants shall be removed without the written permission of an Inspecting Officer."

In these rules "Inspector" means the officer appointed by His Highness the Sultan in Council to be Inspector of Agriculture for the State. While "Inspecting Officer" means any Inspector, subordinate to the Inspector of Agriculture, duly appointed under the Agricultural Pests Enactment.

Revision of Rules.

The rules as at present in force can scarcely be considered to exercise sufficient control over the importation of plants. Small parcels of plants can now enter the Colony, The Federated Malay States and Johore at any port and might introduce serious pests. Moreover cotton and perhaps a few other plants should be added to the list and coconuts should not be allowed free entry into the Federated Malay States and Johore.

The control of plant importation into countries such as these that rely on outside sources for part of their supplies of fruit and vegetables is by no means an easy matter. It is most important not to interfere unduly with trade, but it is equally important to safeguard extensive and valuable cultivations from the danger of new pests and to ensure that new agricultural crops, that may be introduced on a commercial scale in this country, do not bring with them any important pests not existing here. A careful balance has to be struck between these conflicting requirements.

The Agricultural Department is now making it a matter of routine to ask that an Inspector be allowed to examine any new plants likely to be grown on a commercial scale, that are from time to time brought into the Colony or the Federated Malay States, even when such importations are not legally controlled, in order to ensure that the imported plants are healthy.

Proposals have been made to the Governments of the Colony and the Federated Malay States that new rules be brought in consolidating in one place the existing rules; increasing control by the establishment of Entry Ports; establishing a definite method of procedure in the case of plants subject to control; and forming a schedule of plants of

which the importation is controlled, to which schedule additions can from time to time be made. If the suggested revised regulations receive the approval of the Governments they will be published and commented on in a future number of the *Malayan Agricultural Journal*.

The reasons for controlling the import of the plants given in the lists above are contained in the various Gazette Notifications referred to and these should be consulted if reasons are required. It is, however, evident that only a scientific officer well acquainted with the pests and diseases of tropical crops in various parts of the world can give advice in a technical matter of this nature.

LIGHTNING INJURY TO HEVEA BRASILIENSIS.

THE following is an abstract from a paper by Carl D. La Rue, on "Lightning Injury to *Hevea Brasiliensis*," appearing in "Phytopathology" Vol. 12. No. 8. The information contained therein is of interest, as the same type of injury and, in many cases death of young and old rubber trees have been noted in Malaya. As the author points out, it is extraordinarily easy wrongly to diagnose such cases of injury, and attribute them to fungus origin.

Injury to the rubber tree, by lightning, is seldom shown by the splitting or tearing of trunks or branches. The first symptom, drawing attention to the injured tree, is the wilting of the leaves about a foot from the tip of the stem, while those above and below this point are normal. The trunk soon becomes affected, dying back until the root is reached. Several days may elapse from the time the injury is first noted until the death of the tree.

By the time this stage is reached the bark, which was first affected, frequently shows the presence of Diplodia spores, and the case is diagnosed as "Diplodia die-back".

Frequently a number of trees may be killed in one spot, although sometimes only one. The curious fact that the tip of the stem almost always appears normal, while the bark below is dead, is attributed to the rosette of leaves at the tip in some way protecting the stem at this point. The same type of injury had become familiar to the author before he noticed it in young plantations, but, the injury was not, at first, attributed to lightning, until a wire cup hanger, on a tree showing similar injury, was found to have been melted by lightning, this clue being followed until conclusive evidence was secured to show the cause of injury to be also due to lightning. The injury had previously been attributed to Diplodia and the organism in question named *Diplodia rapax*. The author found Diplodia to be the only organism constantly present, this is now known to be secondary and not the cause of death of the tree.

The injury is most pronounced in the cambium region, the tissues of which turn a deep purple and decay rapidly making it easy to trace the progress of the injury. This purple discolouration is regarded by the author to be diagnostic for this type of injury and closely resembles the progress of an infection. The colour often extends outward into the bark nearly to the cork. The dead bark is very different from bark killed in other ways.

Undoubtedly many cases of "die back" in the tops of Hevea trees are due to lightening and wrongly attributed to Diplodia or other organisms.

F. R. M.

INSTRUCTIONS FOR FORWARDING SPECIMENS OF PLANTS ATTACHED BY A FUNGUS DISEASE.

WHEN specimens are received by the Department of Agriculture for Mycological examination, it frequently happens that they arrive in an advanced state of decay which makes diagnosis of the trouble difficult. The object of this note is to give to future senders, instructions which, if carried out, will greatly assist the Mycological staff in determining the cause of a disease.

I. Specimens of branches or roots.

The cut ends should be disinfected—either tarred over or treated with a disinfectant such as Solignum. This will help to keep out secondary organisms which enter through the exposed surfaces and set up decay in wood which, when despatched, may have been quite healthy.

When branches or roots have fungus threads growing along the surface, it does not always follow that the specimen is being attacked by the fungus. The bark underneath the threads should be scraped and the appearance of cortical tissues noted. If the tissues look healthy or otherwise the fact should be mentioned in the covering letter forwarded with the specimens. The scraped specimen should be sent as well as a similar unscraped one. If fructifications of a fungus are associated with such threads these should also be forwarded.

II. Specimens of diseased fruits.

The following specimens should be sent if possible:—

(*a*) A healthy fruit separate from the others.

(*b*) A fruit which is just beginning to show signs of disease. Any wounds on the fruits should be mentioned in the covering letter, as well as any other points which are considered to be abnormal.

(*c*) A fruit in a more advanced state of decay but not completely rotted.

If the above are sent in one parcel the three stages should be separated from each other. If possible the specimens should be wrapped in cotton wool which has been previously soaked in formalin and partly dried.

III. Specimens of diseased leaves.

Early and later stages of the disease should be sent accompanied by details of the attack and remarks as to the condition of soil and roots.

IV. Plants in general.

Plenty of material should be sent, and where it is possible the specimen should include the apparent boundary between diseased and healthy tissue.

Taking the foregoing remarks as a basis, senders should use their discretion when forwarding specimens, always remembering, that, in the case of leaves and fruits and small plants, completely decayed specimens, are, as a rule, useless for examination.

A. T.

THE ERADICATION OF SENSITIVE PLANT MIMOSA PUDICA

Experiments with Sodium Arsenite.

EXPERIMENTS with a view to the destroying of the Sensitive Plant by poisoning with sodium arsenite were carried out at Raub in June 1921 by the Assistant Agricultural Inspector, Pahang North. This plant is found practically all over the Peninsula, chiefly on waste land, and bids fair to do considerable damage to pasture and hill-padi land. It is of very hardy growth and seeds prolifically, the seeds being well protected in a hard pod, provided with strong hairs — thus ensuring the spreading of this pest by animals.

The following table indicates the nature and result of four experiments carried out at Raub.

No. of Expt.	Nature.	Result.
1	A thick clump of *Mimosa pudica* thoroughly sprayed with ¼ lb. Sodium arsenite in 4 gallons water.	Foliage and stems killed in 10 days. New shoots visible after 10 days.
2	A thick clump thoroughly sprayed with 1 lb. sodium arsenite in 4 gallons water.	Foliage and stems killed in 5 days. New shoots visible after 12 days.
3	A thick clump of Mimosa cut to ground-level by changkolling. The ground then saturated with solution of 1 lb. sodium arsenite in 4 gallons water.	New shoots visible after 10 days.
4	A clump of Mimosa weeded as in the previous experiment. The ground then sprayed with crude oil.	New shoots soon visible.

It is therefore evident that the plant cannot be eradicated by this means. Though the foliage and stems are killed, the roots and seeds appear to be unaffected. The only possible action at present seems to consist of continued changkolling, and destroying the roots by burning.

The question of taking steps to enforce the eradication of *Mimosa pudica* is difficult. The plant cannot be considered a pest on coconuts and rubber, as there is no evidence of any actual damage to these trees. It is undoubtedly a pest on grass, though it is questionable whether grasses can legitimately be called cultivated plants. It is therefore extremely doubtful whether action could be taken under the provisions of the Agricultural Pests Enactment, 1913; and special legislation is inadvisable until some more satisfactory method of eradicating the weed has been discovered.

F. W. S.

NOTE ON THE COMPOSITION OF CANTON MUD AND CHINESE FISH POND MUD.

By B. J. Eaton and C. D. V. Georgi.

THE following table gives the results of analyses of Canton mud and so called Chinese Fish Pond mud which have been carried out recently. These products come into the market in the form of slabs resembling baked mud or clay which however are quite friable, and consist of the dried mud from the Chinese fish ponds and are used to a large extent, especially by Chinese, for pot plants. The Canton mud is imported from China, while the Chinese Fish mud is obtained from the local fish ponds.

Mechanical Analysis.

	Canton mud (per cent.)	Chinese fish mud (per cent.)
Fine gravel ...	Nil	1.1
Coarse sand ...	1.1	12.7
Fine sand ...	17.2	22.0
Silt ...	22.3	8.2
Fine silt ...	23.9	10.1
Clay ...	11.9	21.4
Loss on ignition ...	12.4	15.2
Moisture ...	4.3	4.1

Chemical Analysis.

(Calculated on dry Material.)

	per cent.	per cent.
Nitrogen (Total)	0.44	0.36
Nitrogen (Nitric)	Nil	Nil
Phosphoric acid (P_2O_5)	1.16	0.47
Potash (K_2O)	0.76	0.34

As might be expected the mechanical analysis shows that both of the products are composed principally of the very fine soil fractions.

From a chemical point of view it will be observed that, while the Canton mud contains about double the total plant nutrients in the Chinese fish mud, neither can be termed a fertiliser.

Conclusions :—It has been found that these baked or dried muds are very suitable for the cultivation of various pot plants, particularly dahlias, chrysanthemums and asters and they are largely employed at present in public gardens and also by Europeans who specialise in the cultivation of the flowering plants mentioned above.

As soils, they may be considered comparatively rich and this combined with their mechanical texture and the open nature of the

soil when the material is broken up into small pieces for potting purposes is probably the chief reason of their successful application in horticultural work. It is also possible that the baking or drying of the muds may have affected the bacterial contents and that they resemble partially sterilised soil, which Russell and others subsequently have shown to possess valuable qualities particularly for intensive cultivation.

Comparative value.—The imported Canton mud costs locally $10.50 per bag of 180 katies (1 kati = 1⅓ lbs.) while the local Chinese fish pond mud can be procured at $1.10 per picul (1 picul = 133⅓ lbs) The latter product, although not as rich as the Canton mud, is a good substitute and much more economical. (D A. 1172/1921).

REVIEW.

INVESTIGATIONS ON OILPALMS.

By Dr. A. A. L. Rutgers.

Edited by the A.V.R.O.S. Medan, Sumatra.

THE progress made in Sumatra with the cultivation of the African Oil Palm (*Elaeis guineensis*. Jacq.) has already been referred to in the Agricultural Bulletin, F.M.S. (1). The publication under review indicates the relative importance of this crop in Sumatra at the present time and contains a valuable survey of the investigations carried out by Dr. Rutgers and his assistants at the Experimental Station of the A.V.R.O.S.

The present planted area on the east coast of Sumatra is over 28,000 acres and rapid extension is anticipated. The greatest difficulties experienced have been in the preparation and marketing of the product due to bad communication with Europe during the war. These difficulties are, however, rapidly disappearing and the export of palm oil from the East should be on a sound commercial basis in the near future.

It is not possible here to refer in detail to the very important experimental results obtained and practical suggestions put forward by the Experimental Station of the A.V.R.O.S. The book should be in the hands of all persons interested in oil palm culture in this country. The practical planter will find much of interest in the chapters on Planting, Upkeep of the Plantation, Preparation of the Palm oil and, finally, the Packing, Shipping and Marketing of the Crop. The preliminary paper on the varieties of oil palms and progress being made with selection of desirable types is of considerable importance to the scientific investigator. Dr. Heusser describes in detail the artificial pollination of the palm for the increased production of fruit and shows by actual experiment its necessity in Sumatra. From experience gained in this country, the reviewer is of the opinion that excessive pollination may result in the production of bunches of fruit with thin pericarp and in gradual weakening of the palms. This, however, may be due to a variety of causes, one of which being poorness of soil.

The book marks a distinct advance in oil palm culture in the East and it is to be hoped that Malaya will not fail to take advantage of the possibilities of this crop, which has already shown itself so suited to the conditions of the Peninsula.

J.N.M.

(1 Agric. Bulletin, F.M.S. Vol. IX No. 2 p. 90. "The African Oil Palm in Sumatra."

SHORT SUGAR SUPPLIES AND STAGNANT TRADE.

(Reprinted from "Tropical life" of 29th June 1922).

I fear that the confectionery trade as a body, and its retail members in particular, are unlikely to have seen, and still less likely to have studied carefully, the excellent article on trade recovery which Lieutenant-Colonel Amery, M.P., contributed to the "Observer," of June 25th. Yet how very pertinent are his remarks, and with what authority does he speak.

Lieutenant-Colonel Amery (who, it will be remembered, was Under-Secretary for the Colonies, under Lord Milner and Mr. Churchill until fairly recently, when he became Parliamentary Secretary to the Admiralty) starts by dealing with the need of widening the channels for earning our living, and whilst doing so, of extending the bases for levying taxation, so that there may be an adequate amount to meet our requirements without too great a strain either on the individual or the trade or industry, as is undoubtedly the case at present with sugar. Were we to encourage sugar-production within the Empire, as America has done in her small West Indian island of Porto Rico, what a difference it would make to the future stability of our confectionery, chocolate-making and other industries at present dependent on exotic sugar supplies for their raw material.

With the advent of steadily increasing supplies of refined, i. e., of granulated sugar, direct from the estates, many profits can be saved, whilst the risks of being cornered by refiners, by the market, or by speculators would disappear. On the other hand, since Porto Rico has shown such a marvellous increase in her sugar output (see Mr. Ormesby-Gore's paper, read before the Royal Colonial Institute), an increase which seems to leave the fairy tale of the Gold Coast and her cocoa output quite in the shade, there is no reason, so far as the natural resources are concerned, why this Empire and India should not feed the world with sugar, instead of being fed by the world, and paying such a high price in the United Kingdom for what we get. Increase the preference on British-grown sugar, and, when we are self-supporting, every five pounds given means that amount knocked off the cost of your raw material.

It has always been a wonder to me, considering the importance of our sugar-consuming industries—confectionery, biscuit-making, mineral waters, chocolate, jam and preserves, etc., all needing refined sugar—that the big firms interested in such goods,now that white granulated can be produced more economically probably in the long run than any other kind, have never run estates of their own, or invested sufficient capital in established concerns to be entitled to call for the tune (at least in some degree), i. e., to specify to what degree the "breaks" shall be refined, providing, of course, their orders are sufficiently large, either collectively or individually, to take such parcels. How much better for many estates if this could be done instead of allowing, or forcing

them (as at present) to drift into the hands of banks or financiers, who do not understand their management and have no professonal interest or pride in their crops except as a means of liquidating such advances as they may have made.

"The one overmastering problem which confronts us as a nation," writes Colonel Amery, "is how to bear, witout industrial and social collapse, the burdens which the war has left behind it. . . . The real solution lies, not in trying to get rid of our responsibilities, but in strengthening and broadening the shoulders which have to bear them. . . . we have to build up an industry and a trade which can, without difficulty, carry the post-war burdens. Such statements, it appears to me, apply to the sugar-using trade to an unusual degree. Lancashire is striving against long odds to assure itself supplies of raw cotton from within the Empire, but what are the sugar consumers doing to safeguard the life and prosperity of their industries? The war and Lenin have crippled Europe, and it will remain maimed for a good generation to come. Why therefore, look to or again trust so broken a reed for your sugar supplies, as so many are doing when trying to kill all duties, etc., levied to encourage sugar production elswhere, and especially within the Empire. The great opponents to so praise-worthy a scheme are the refiners, who feel that their present easy-going method of getting rich without much effort is being cut away from under their feet. Why do they not follow the lead of rubber manufacturers and also join in the efforts that the true believers in the future of the Empire are striving after, viz., to assure supplies of sugar from our own lands, and thus be free from past troubles when trying to place our manufactured articles on the markets of the world at a fair price in competition with other countries.

Colonel Amery truly claimed that the British Empire is really the greatest undeveloped estate in the world. This means that we have the chance, above the average, of offering remunerative employment to all our people, as I long ago claimed in my book on "How to Pay for the War." Since this is so think of how easily we should be able, whilst developing this estate to increase the channels and volume of employment for all willing and anxious to make good, instead of having so many, many thousands hopelessly unemployed, in sharp contrast to the hundreds in work, including those who are overpaid for the work they condescend to do.

Such remarks are opportune, because America, rolling in wealth and anxious to kill time, as having no Empire to rule her big men naturally find life a bit monotonous, is quite willing to boom Cuba as being in the depth of despair over her sugar, in order to discourage and kill competive production elsewhere. Having done this, she can then, after playing a waiting game to "buck up" production there and elsewhere under the Stars and Stripes and "boost" American sugar for all she is worth (and America is worth much when it comes to "boosting" and big talk), to monopolise the world-trade both in the production and refining of sugar, so that she can dictate terms (as we could if we developed our sugar production industries), and say what other countries can have and what they must pay for it.

There are those who smiled at my warning note in your issue of June 8th, p. 794, against postponing purchases of sugar whilst America was filling up her storehouses as fast as could be, and Germany was growing more and more menacing as a buyer as well. I would, however, claim that the situation to-day is even more strained than when I wrote, only now I believe efforts are being made for this country to secure supplies—at a price.

Furthermore I believe the competition among buyers will continue. America has the money to compete against all comers in the market for raws, and having cut them out to sell them refined sugar at her own price later on. She knows only too well, as we are now told, that the Continent already shows signs of wanting two million tons during the next twelve months, not only because climatic conditions have gone against her beet output, but because, and especially on account of, economic reasons as well. So long as the price of cereals and foodstuffs generally within the sugar-beet belt of Europe continues to be so high the cultivation of the beets will be discouraged and tend to fall to a minimum (as per their land tenure), and thus, by reducing the output of sugar, cause Europe to continue as a buyer from elsewhere, with the likelihood of increasing her demands as time goes on.

If this is how the story runs, would it not be better to develop our latent sugar production resources, and thus assure supplies for our own industries at a reasonable price?

During the three years and five months from January, 1919, to May, 1922, the U.K. has received and taken into home consumption the following tonnage of raw and refined sugars:—

Received in 41 mths.		Taken into Home Use in 41 mths.	
Raw.	Refined.	Raw.	Refined.
Tons.	Tons.	Tons	Tons.
3,823,354	1,250,052	3,473,486	1,176,154

This works out, over the long period shown, at 3 lbs raw to 1 lb. refined. Allowing that one-third of the raw does not go through the refiner's hands this shows as I have claimed, that this country now is receiving a ton of refined sugar to every 2 tons refined in the U.K. With America's tendency to dominate the world's sugar market and become refiner-in-chief, would it not be as well to encourage our own lands yet to be planted and estates already established, to turn out more sugar, and granulated at that, in order to prevent sugar consumers here from becoming as dependent upon America for supplies as we are at present and have been for so long, for cotton ? Ever since last November I have been warning buyers not to trust the tales of overstocks of sugar, but to buy whilst sugars were low, say at 12s. (sellers), or 10s. (buyers), on December 31st, for 96 per cent. cane against 17s. 3d. and 16s. now—just 50 per cent. more. If I have proved right in this, why not trust me to be correct also regarding the tendency for this country and Empire to become more dependent on America's good will for our refined sugar supplies ?

DERRIS AS AN INSECTICIDE.

(Extract from an Article by N. E. McIndoo, A. F. Sievers, and W. S. Abbott in Journal of Agricultural Research, Vol XVII, No. 5.)

Derris applied as a Powder against various Insects.

Dog Fleas.—Eight dogs badly infected with fleas (*Ctenocephalus canis* curt) were dusted thoroughly. The material was applied with a shaker and well rubbed into the hair with the hands. At the end of 48 hours no living fleas were observed. Several dead ones were seen still clinging to the hairs.

Chicken Lice.--Twelve hens badly infested with several species of lice (Mallophaga) were thoroughly treated with the powder, which was well rubbed in through the feathers. When the hens were examined two or three days later, they were free from lice.

Abstract of Meteorological Readings in the various Districts of Malaya for the month of September, 1922.

District.	Mean Barometrical Pressure at 32° Fah.	Maximum in Sun.	Temperature.				Hygrometer.				Prevailing Direction of Winds.	Total Rainfall.	Greatest Rainfall during 24 hours.
			Mean Dry Bulb.	Maximum.	Minimum.	Range.	Mean Wet Bulb.	Vapour Tension	Dew Point.	Humidity.			
Kelantan, Kota Bahru	...	145.38	81.3	90.4	73.9	15.5	76.1	.801	72.6	75%	...	10.68	3.78
Pahang, Kuala Lipis	...	...	80.7	90.2	70.0	20.2	76.0				...	11.84	2.75
Johore, Johore Bahru	...	...	...	87.71	73.20		...				...	9.48	2.12
Singapore, Kandang Kerbau	...	...	...	...	...		...				...	...	...
Malacca, Durian Daun	...	129.	83.	88.	74.	14.	78.	.906		82.	N.W.	6.77	2.71
Negri Sembilan, Seremban	...	153.6	80.3	91.1	70.7	20.4	75.8	.811	73.1	79.2	N.E.	2.81	1.18
,, Kuala Pilah	...	152.	81.4	89.7	70.3	19.4	77.6	.868	74.9	81.4	...	7.88	4.74
,, Port Dickson	...	153.1	83.2	88.6	74.6	14.	78.5	.879	75.5	77.6	...	5.47	1.92
Selangor, Kuala Lumpur	...	146.	82.2	89.8	72.6	17.2	76.5	.806	72.8	73.	S.W.	3.81	1.06
,, Klang	...	...	81.2	86.2	74.4	11.8	76.6				...	4.02	1.93
,, Kuala Selangor	...	...	...	89.7	69.9	19.7	...				...	6.07	2.33
,, Rawang	...	...	...	...	...	...	...				...	...	...
Perak, Telok Anson	...	...	82.16	93.	70.	23.	77.02	.862		79.	...	3.30	2.82
,, Ipoh	...	...	81.63	95.	71.	24.	76.47	.842	74.63	78.	...	7.83	1.83
,, Taiping	...	...	80.23	93.	72.	21.	76.64	.863	...	82.	...	7.12	1.77
,, The Cottage	...	...	...	...	...	...	...	...	...	...	...	13.85	2.87
,, Parit Buntar	...	...	82.45	93.	71.	22.	77.66	.884	...	81.	...	9.09	2.83
Penang, George Town	...	156.	88.8	91.	70.	21.	78.4	.942	72.	89.3	S.W.	19.6	2.67
Kedah, Alor Star	...	...										16.19	4.27
Perlis, Kangar	...	...										...	...